

## What is claimed is:

1. A grant generator apparatus for generating grants of available transmission channel bandwidth in a network, said apparatus comprising:

a first grant table for storing therein grants corresponding to a first-size of said available transmission channel bandwidth,

at least one other grant table for storing therein grants corresponding to a second-size of said available transmission channel bandwidth; and

a grant distributor coupled to said first and said at least one other grant table for distributing a first number of grants from said first table and at least a second number of grants from said other grant table according to a predetermined pattern.

2. The apparatus of Claim 1, wherein said network is a passive optical network (PON).

3. The apparatus of Claim 2, wherein said passive optical network (PON) is an ATM-PON.

4. The apparatus of Claim 1, wherein said grant distributor includes a clock divider coupled to said first and said at least one other grant table, said clock divider providing a first number of grant selections to said first grant table and at least a second number of grant selections to said other grant table, said first and second number of grant selections corresponding to said first and second number of grants.

5. The apparatus of Claim 4, further including a first address counter and at least a second address counter coupled between said clock divider and said first and other grant table, respectively, said first and second address counter operable to sequentially select grant table locations in said first and other grant table in accordance with said grant table selections from said clock divider.

6. The apparatus of Claim 5, further including a multiplexer coupled to outputs of said first and other grant table and to outputs of said clock divider, said clock divider selecting an appropriate input port of said multiplexer for output of grants therefrom based on the grant selection of said clock divider.

1           7.       The apparatus of Claim 6, wherein said grant generator includes N grant  
2 tables and N corresponding address counters, said grant generator further including (N-1)  
3 clock dividers and (N-1) multiplexers, said clock dividers and said multiplexers coupled  
4 to said N grant tables and address counters in a recursive structure.

1           8.       The apparatus of Claim 1, further including dynamic bandwidth  
2 management control logic operable to alter slots in one or more grant tables based on  
3 receipt of a triggering parameter.

1           9.       The apparatus of Claim 8, wherein contents of said grant tables are  
2 updated upon a change in end user connections of said ATM PON network.

1           10.      A grant generator apparatus for generating upstream grants of available  
2 transmission channel bandwidth in a passive optical network, said apparatus comprising:  
3           a first grant table for storing therein grants of a first bandwidth granularity of said  
4 available transmission channel bandwidth,  
5           at least one second grant table for storing therein grants of a second bandwidth  
6 granularity of said available bandwidth channel bandwidth; and  
7           a grant distributor coupled to said first and second grant table for distributing a  
8 first number of grants from said first table and at least a second number of grants from  
9 said second table according to a predetermined pattern.

1           11.      The apparatus of Claim 10, wherein said predetermined pattern is selected  
2 to substantially accommodate low bandwidth requests in said network.

1           12.      The apparatus of Claim 10, wherein said passive optical network (PON) is  
2 an ATM-PON.

1           13.      The apparatus of Claim 10, wherein said first grant table, said second  
2 grant table and said grant distributor are recursively coupled to produce finer granularity  
3 grants at subsequent levels.

1           14.      The apparatus of Claim 11, wherein said grant generator is included in an  
2 OLT of said ATM-PON.

1           15.      The apparatus of Claim 14, wherein said grant generator is implemented in  
2 a medium selected from the group consisting of FPGA and ASIC.

16. The apparatus of Claim 13, wherein said grant distributor includes a clock divider coupled to said first and said at least one second grant table, said clock divider providing a first number of grant selections to said first grant table and at least a second number of grant selections to said second grant table, said first and second number of grant selections corresponding to said first and second number of grants.

17. The apparatus of Claim 10, wherein the content of said grant tables is updated upon a change in end user connections at said ATM-PON.

18. The apparatus of Claim 10, further including dynamic bandwidth management control logic operable to alter slots one or more grant table based on receipt of a triggering parameter.

19. A method of generating bandwidth grants in a passive optical network, said method comprising the steps of:

- providing a first grant table for storing grants of a first bandwidth granularity therein;
- providing at least one other grant table for storing grants of at least a second bandwidth therein; and
- distributing grants from said first grant table and from said other grant table downstream to ONT units coupled to said PON, a first number of grants being distributed from said first table and a second number of grants being distributed from said second table over a complete grant cycle, wherein said grant cycle repeats itself upon completion.

20. The method of Claim 19, wherein the content of said grant tables is updated upon a change in end user connections at said ATM-PON.

21. The method of Claim 19, wherein said step of distributing includes utilizing a clock divider to provide a first number of grant selections to said first grant table and at least a second number of grant selections to said second grant table, said first and second number of grant selections corresponding to said first and second number of grants.

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22. The method of Claim 20, wherein said first grant table, said second grant  
2 table and said grant distributor are recursively coupled to produce finer granularity grants  
3 at subsequent levels.

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